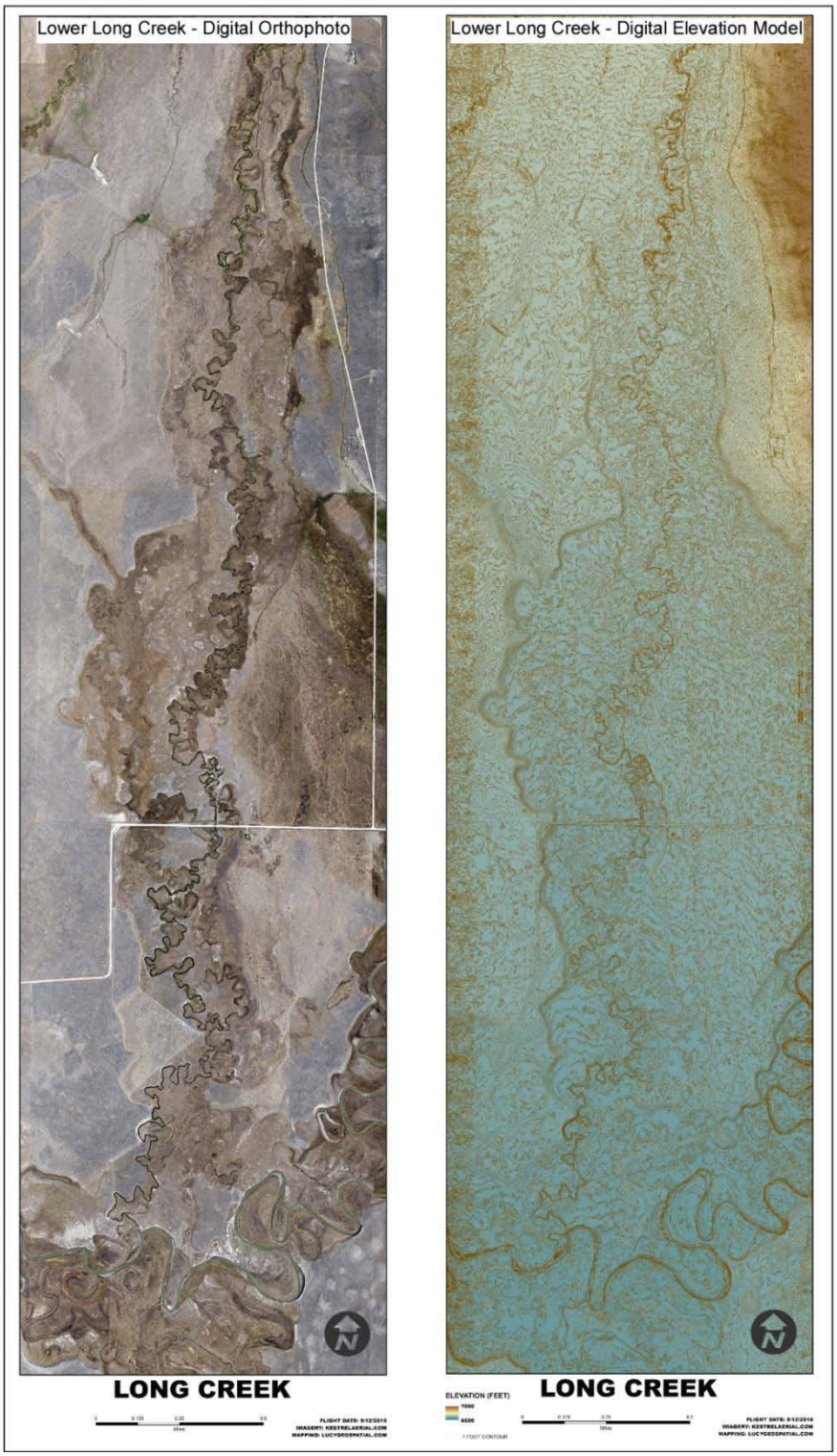

Figure 9. High-resolution orthophoto converted photogrametrically to a digital elevation model. The elevation model was utilized to create floodplain inundation maps to gain a long-reach understanding of channel condition and to guide design of riffle.

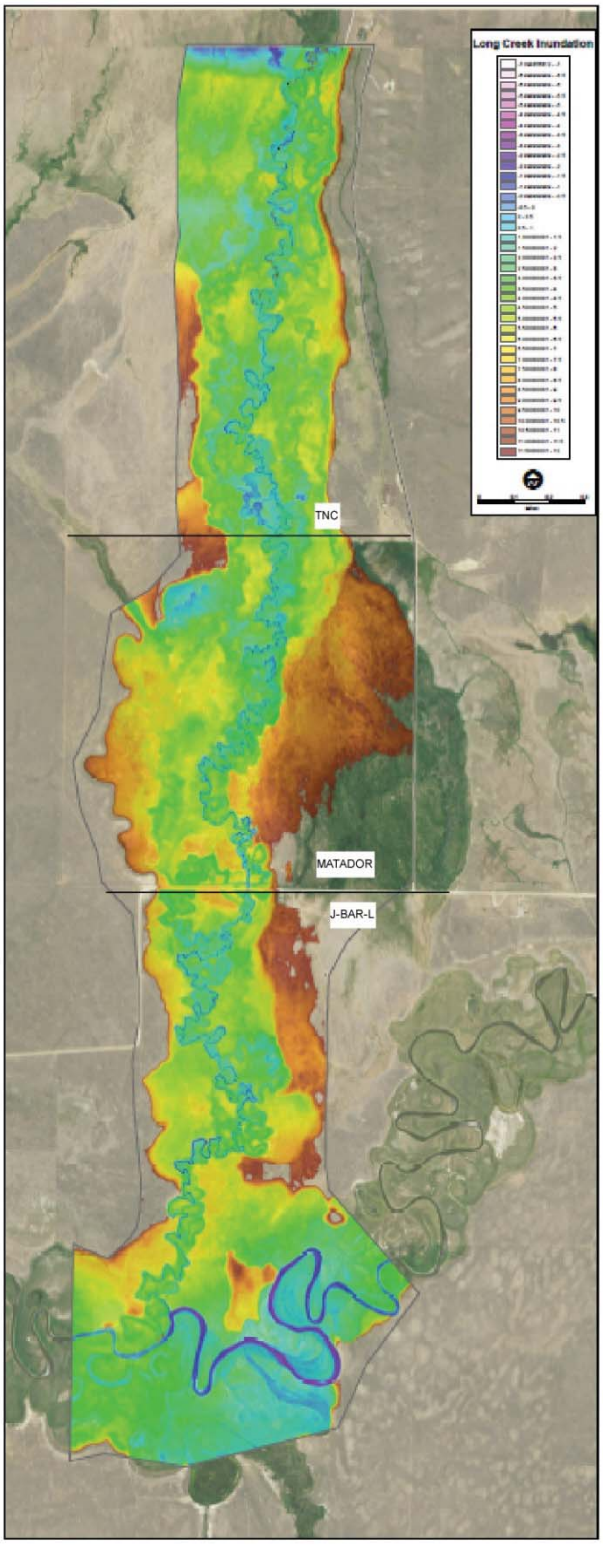

Figure 10. Inundation map of Long Creek from confluence with Ruby River to top of TNC project site. Colors are related to elevation above or below the channel bed.

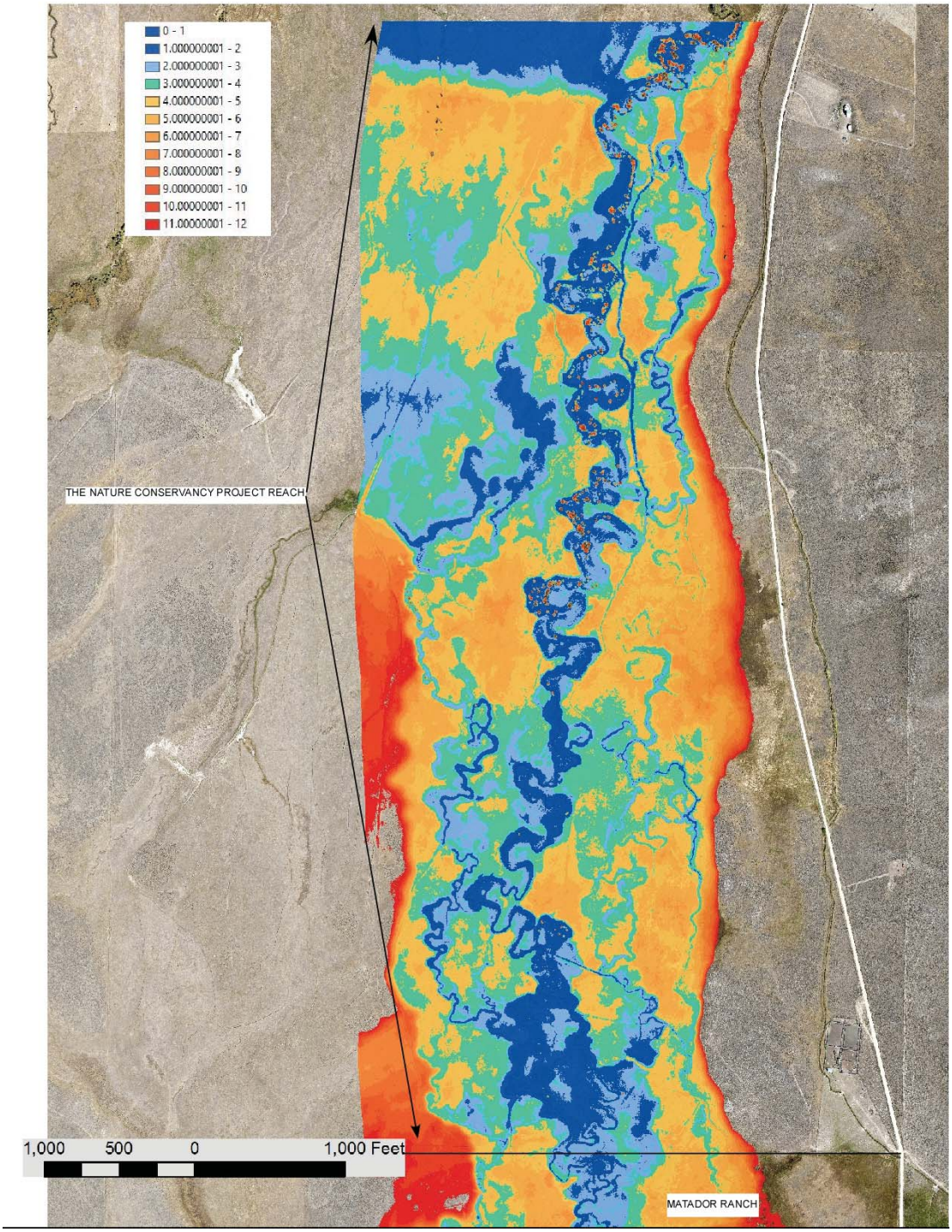

Figure 11. Inundation map of TNC project reach with the color ramp adjusted to emphasize floodplain areas 1-3 feet (blue through turquoise) above the existing channel bed. The orange clusters along the streamside are existing willows.

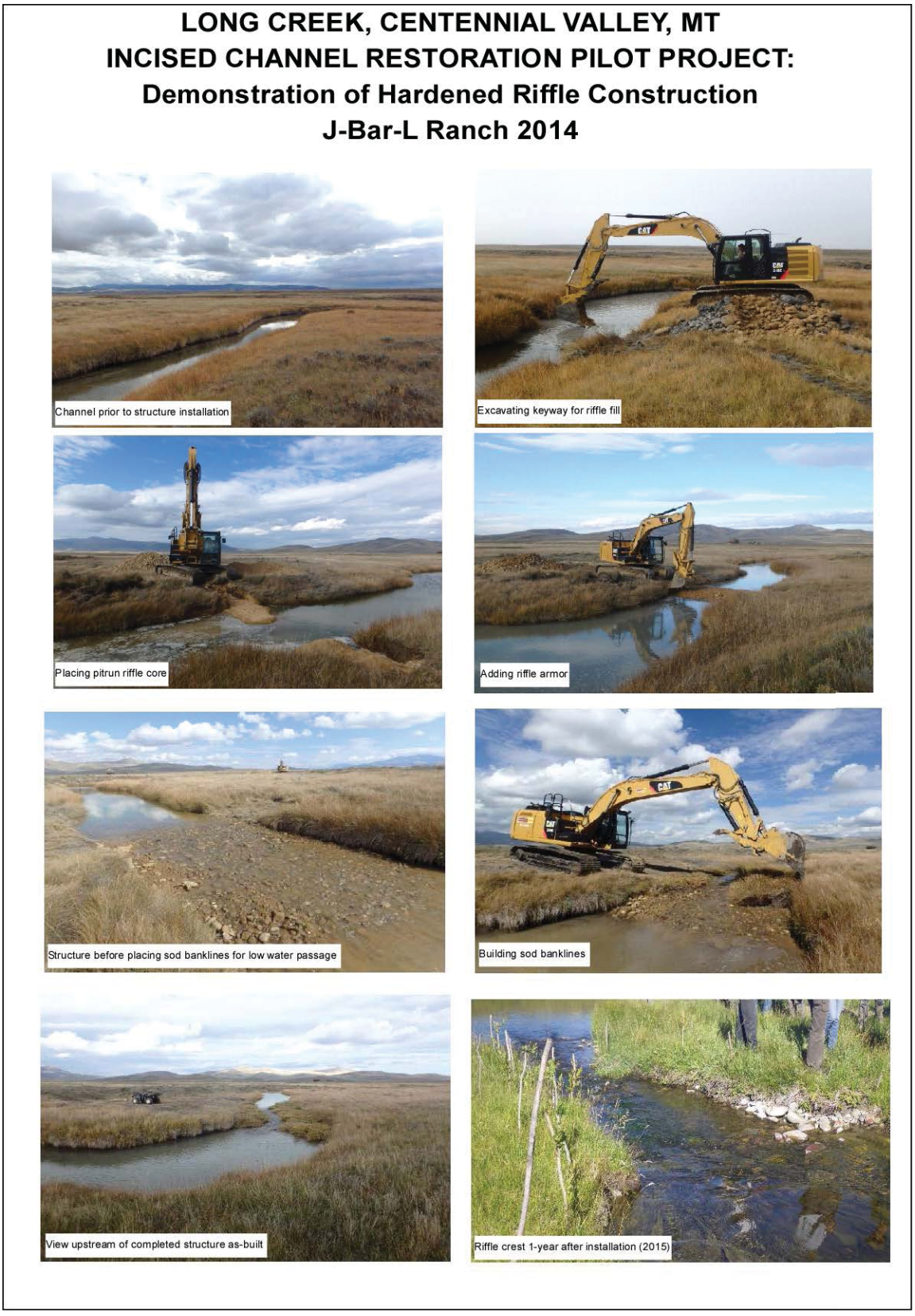

Figure 12. Photo construction sequence of an armored riffle and sod grade control structure.

be submerged upstream of the structures will be utilized to build the downstream right and left banks of the structure. The channel width over the crest of the riffle will be approximately 5 feet to insure sufficient water depths for fish passage during baseflow periods. The downstream banks are designed for regular overtopping events during runoff without concentrating channel energy in the passage channel.

4.2.4 Riffle Structure Spacing

Figure 13 indicates designed structure spacing. Note that the majority of the structures are separated by channel sub-reaches where no work occurs. A "tail-water to dam" condition occurs in only one two structure series and is designed as an analogue for a beaver inhabited reach with a more density of backwater. Please also refer to Appendix A: Project Design Sheets for existing and proposed base flow water profiles over the project reach.

4.2.5 As-built and Projected Future Conditions Inundation Mapping

We are currently expanding the analytical aspects of the DEM-based inundation models inside the GIS platform. Following is a discussion of some mapping products we developed for the current project.

4.2.5.1 As-built – Short Reach Scale Inundation Map During Peak Runoff

Figure 14 depicts 3 different subreaches where an inundation map was "micro-modeled" to provide more detail relative to anticipated flow distribution during average peak discharge events rather than the coarser project level map in Figure 9. These maps clearly indicate that perched side-channels and adjacent floodplain will be wetted. As the hydrograph moves towards base flow conditions these surfaces will likely persist into the summer as a mosaic of wetland types.

4.2.5.2 Projected Conditions Inundation Map Following Bed Aggradation and Full Floodplain Reconnection

Figure 15 portrays the desired channel and floodplain connection 10+ years from project completion. The areas experiencing an active annual hydroperiod (0-4 feet above existing channel bed) shown in the blue-to-green color ramp were created using an assumption that the channel will aggrade 2 feet on average due to the installed grade control structures. A simple visual assessment suggests that the fluvially affected surface will be significantly higher than that portrayed in existing conditions inundation surface map (Figure 10). While it is not known if sediment and bedload transport is high enough to fully aggrade the project reach up to 2 feet within 10 years, this map can be compared to actual conditions 10 years distant (2024) to further illuminate the utility of and accuracy of our current mapping projections.

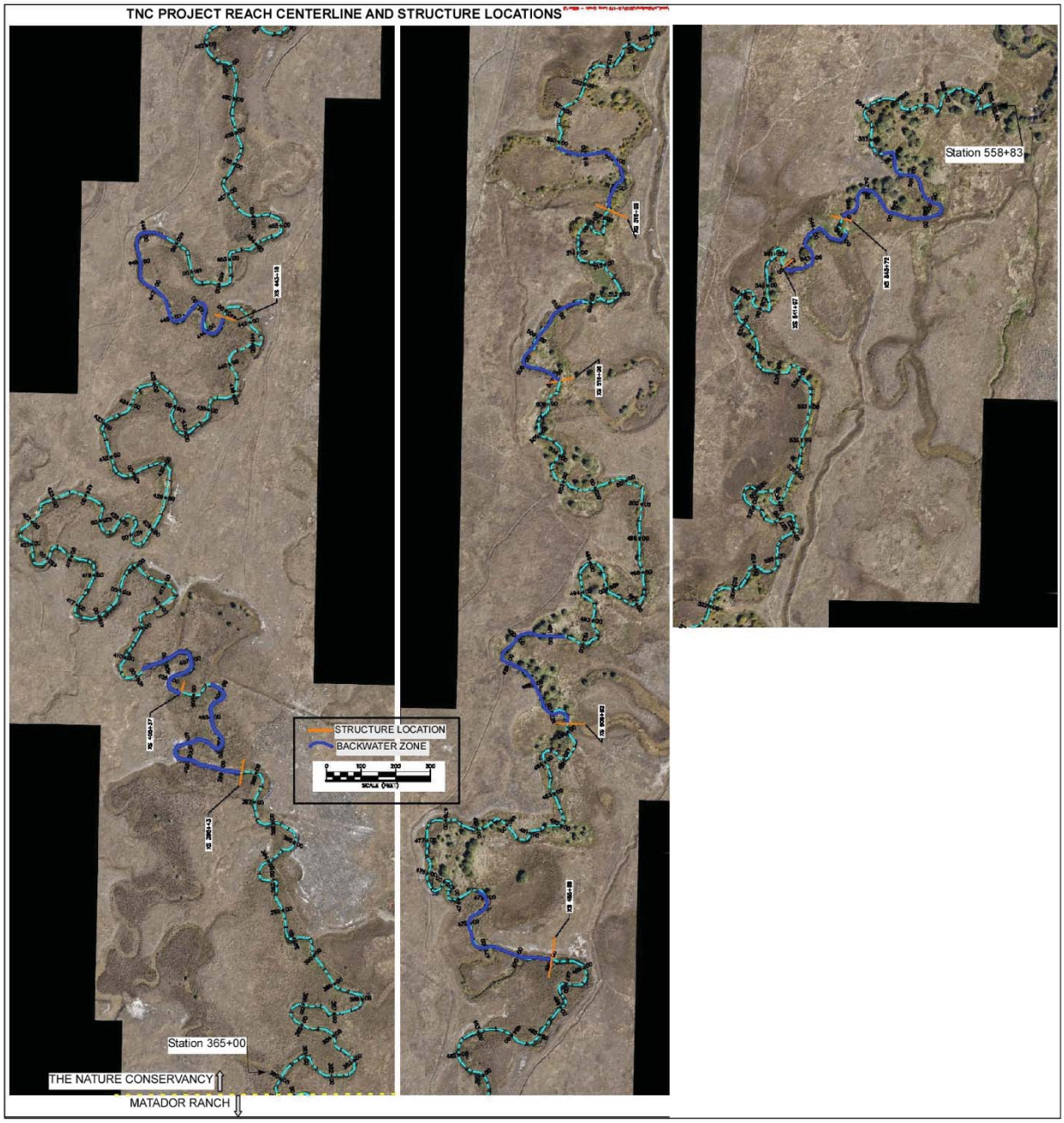

Figure 13. Designed structure locations for The Nature Conservancy project reach Station 365+00 to 558+83 (3.67 miles). Matador Ranch is south (downstream) of Station 365+00.

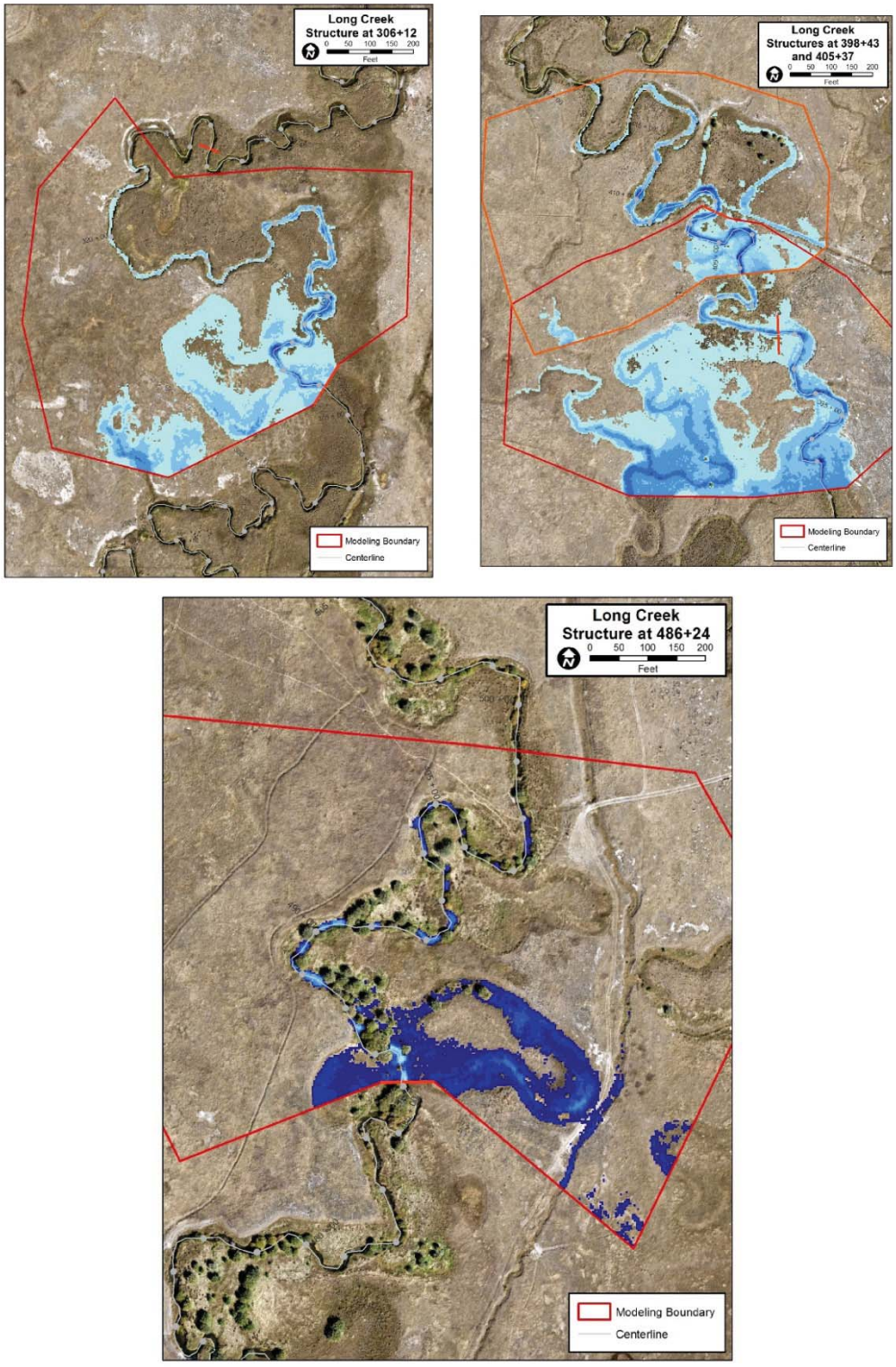

Figure 14. Three subreaches modeled to project inundation surfaces in the as-built condition during an average peak runoff event.